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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/508,858	09/24/2004	Masatoshi Hotta	Q69368	8566
23373 7590 06/16/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER MERKLING, MATTHEW J	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 06/16/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/508,858

Applicant(s)

HOTTA ET AL.

Examiner

MATTHEW J. MERKLING

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/9/08 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. By using the claim language "only", Applicant is presenting a limitation that was not disclosed in the specification as originally filed. In other words, Applicant is excluding all structures in which the second end of the heat exchanger is not "only" connected to the bottom of the outer casing and a double piping. The originally filed disclosure does not include this exclusion.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 1, 2, 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable in view of Christensen (US 3,041,151) in view of Minet et al. (US 4,692,306).

Regarding claims 1, 2 and 6, Christensen discloses a reaction apparatus comprising a heat exchanger (shell (6), tubes (21)) and a reactor (catalyst bed, (11)) with a heater (electric heater, (7), col. 4 lines 24-26)), which are enclosed in an outer casing (shell (1)), wherein the heat exchanger has a first (top of heat exchanger as depicted in Fig. 2) end and a second end (bottom of heat exchanger as depicted in Fig. 2) whereby the first end of the heat exchanger (6, 21) being connected to the reactor (11), and the second end of the heat exchanger (6, 21) and the bottom of the outer casing (45) being fixed to each other by a flange (28, see Fig. 2), and a double piping (see Fig. 2) having an inner tube (50) and an outer tube (which is connected to outlet 51) for introducing a gas to be treated through the inner pipe (49, col. 5 lines 5-9) and discharging the treated gas through the annular space, or outer pipe (see Fig. 2, col. 5 lines 33-39), such that the gas passes through the heat exchanger (after entering through 49, the gas enters into heat exchanger 6,21), the reactor (after exiting the heat exchanger, the gas travels to the reactor 11) and the heat exchanger (after reactor gas travels back down to the heat exchanger 6,21) in this order during the process (see gas flow directions in Fig. 2).

While Christensen teaches a heat exchanging reactor comprising a shell (1) that surrounds the reactor and heat exchanger, Christensen does not explicitly disclose a second end of the heat exchanger and only a bottom of the outer casing being fixed to each other by a flange.

Minet also discloses a reaction apparatus that combines a heat exchanger and a reactor (see abstract, Fig. 1).

Minet teaches reactor internals (such as 12, 14 and 16) that are connected to only the bottom of the outer shell (38) in order to facilitate removal of the outer shell and provide access to the reactor internals.

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the reactor structure of Christensen and implement a design (as taught by Minet) where only the bottom of the outer casing is fixed to the heat exchanger at the second end (thereby fixing the entire reactor structure of Christensen inside the outer casing) in order to facilitate removal of the outer shell and provide access to the reactor internals.

Regarding limitations recited in claim 1 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents

thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.

Regarding claim 8, the claimed orientation (horizontal) of the reaction apparatus does not distinguish the claimed invention over the prior art as changing the orientation of the apparatus would have been obvious to one of ordinary skill in the art to meet needs of installation space constraints. Furthermore, shifting the orientation of the apparatus does not change the operability of the apparatus and does not confer patentability (see MPEP §2144.04).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) and Minet et al. (US 4,692,306) as applied to claim 1 above, and further in view of Keto et al. (US 3,732,517).

Regarding claim 3, Christensen, as discussed in claim 1 above, teaches a casing that is removable via bolts (47), but fails to teach an eyebolt fixing part for detachably engaging the outer casing to the reactor.

Keto discloses an apparatus that contains a removable fuse assembly from a casing.

Keto teaches an eyebolt (26) located at the top of the apparatus in order to facilitate separating the fuse assembly from the casing (col. 2 lines 51-53).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the eyebolt of Keto to the top of the reaction apparatus of Christensen in order to facilitate the separation of the casing from the reaction apparatus.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) and Minet et al. (US 4,692,306) as applied to claim 1 above, and further in view of Serratore et al. (US 3,278,633).

Regarding claims 4 and 5, Christensen, as discussed in claim 1 above, teaches heat exchange between the reactor and the surrounding gas (see flow direction of untreated, gas past reaction chamber) and between the gas flowing in the double piping into and out of the reaction apparatus (see flows 49 and 51). Christensen, however, fails to teach fins located in the reactor and between the inner and outer pipes.

Serratore discloses a reaction apparatus with heat exchange between the components in the reaction apparatus.

Serratore teaches fins attached to heat exchange surfaces in order to increase heat exchange efficiency (col. 3 line 74 – col. 4 line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the fins of Serratore to the reactor and the inner and outer pipes of Christensen in order to improve the heat exchange efficiency between process components.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) and Minet et al. (US 4,692,306) as applied to claim 6 above, and further in view of Nakamura et al. (US 3,814,171).

Regarding claim 7, Christensen, as discussed in claim 6 above, discloses a preference for decreasing the temperature of a converted exiting gas as much as possible

in the interest of recovering the maximum amount of heat from the converted gas (col. 1 line 59 – col. 2 line 27). One way of doing this is to use excess heat from the converted gas to heat a boiler and produce steam (col. 1 line 59 – col. 2 line 27). Christensen, however, fails to teach a radiating plate on the outer tube (exiting tube) of the double piping.

Nakamura also discloses an apparatus for maximizing heat transfer between two streams.

Nakamura teaches adding radiating plates to the outer surface of heat transfer tubes in order to promote heat exchange efficiency (see claim 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the radiating plates of Nakamura, to the outer surface of the exiting gas tube of Christensen in order to promote heating exchange efficiency between the exiting gas and a boiler to maximize energy recovery and produce steam from the boiler, as mentioned in Christensen.

Response to Arguments

9. Applicant's arguments filed 5/9/08 have been fully considered but they are not persuasive.

On page 2, Applicant argues that the added limitation “only” does not constitute new matter. The examiner respectfully disagrees. The examiner notes that, as originally filed, there is no disclosure that the second end of the heat exchanger 'cannot' be fixed to any other portion of the outer casing other than the bottom of the outer casing. By using terminology such as

"only", Applicant has explicitly made exclusions that were not present in the originally filed disclosure.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795